

<p align="center"><b>II NINHYDRIN</b></p>	<p align="center">Page 1 of 2</p>
<p align="center"><b>Division of Forensic Science</b></p> <p align="center"><b>IMPRESSION UNIT PROCEDURES MANUAL</b></p>	<p align="center">Amendment Designator:</p>
	<p align="center">Effective Date: 31-March-2004</p>
<p align="center"><b>II NINHYDRIN-Porous Items</b></p> <p><b>2.1 INTRODUCTION</b></p> <p>Ninhydrin, or triketo-hydrindene hydrate, is an extremely sensitive indicator of alpha-amino acids, proteins, peptides and polypeptides. The reaction produces a violet to blue-violet coloring of these substances and is effective even with older deposits and/or minute amounts of amino acids. While ninhydrin can be used on any surface, processing normally is confined to porous items which are not water-soaked and do not contain inherent animal proteins.</p> <p><b>2.2 PREPARATIONS</b></p> <p>Ninhydrin is readily soluble in most organic solvents. Working solutions of ninhydrin are governed by the nature of the solvent and the strength of the solution. Concentrations of the ninhydrin solution may vary according to application, but generally a 0.5% to 1.0% weight to volume mixture produces the best results. A 0.5% concentration is recommended for routine porous item processing. Ethanol, methanol, petroleum ether, and acetone have high damage potential but are acceptable for non-document porous material. Any of the listed solvents may be used at the examiner's discretion. Commercially prepared ninhydrin may be used, no specific preparation is needed.</p> <p>Recommended Preparation- 0.5% concentration:</p> <p><b>2.2.1 Petroleum Ether</b></p> <p><b>2.2.1.1 Chemicals Required</b></p> <ul style="list-style-type: none"> <li>• 10 grams Ninhydrin</li> <li>• 60 ml Methanol</li> <li>• 80 ml 2 - Propanol (Isopropyl Alcohol)</li> <li>• 1860 ml Petroleum Ether (Fill measured beaker to the 2000 ml Level)</li> </ul> <p><b>2.2.1.2 Directions</b></p> <ol style="list-style-type: none"> <li>1. Dissolve Ninhydrin crystals in Methanol.</li> <li>2. Add 2 - Propanol to Ninhydrin/Methanol solution and stir.</li> <li>3. Add Ninhydrin, Methanol, 2 - Propanol solution to Petroleum Ether and stir.</li> </ol> <p><b>2.2.2 Acetone</b></p> <p><b>2.2.2.1 Chemicals Required</b></p> <ul style="list-style-type: none"> <li>• 25 grams Ninhydrin</li> <li>• 4 liters of Acetone</li> </ul> <p><b>2.2.2.2 Directions</b></p> <ol style="list-style-type: none"> <li>1. Dissolve Ninhydrin crystals in Acetone.</li> </ol> <p><b>2.2.3 Test Strips</b></p> <p><b>2.2.3.1 Chemicals Required</b></p> <ul style="list-style-type: none"> <li>• 1 gram Norleucine</li> <li>• 100 ml warm distilled water</li> <li>• blotter papers</li> </ul>	

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<p>2.2.3.2    Directions</p> <ol style="list-style-type: none"> <li>1. Dissolve Norleucine in distilled water until clear.</li> <li>2. Saturate blotter papers and air dry.</li> <li>3. Cut papers in small pieces.</li> </ol> <p><b>2.3    INSTRUMENTATION</b></p> <p>An environmental chamber or a steam iron may be used to control the heat and relative humidity that the item of evidence is submitted to after processing.</p> <p><b>2.4    MINIMUM STANDARDS AND CONTROLS</b></p> <p>Process a test strip as in 2.5.1 or 2.5.2. If the test strip turns purple the working solution can be used to process evidence. Documentation of this process must be included in examiners notes to show a positive reaction. This can be done by writing "positive reaction", "+", or "purple".</p> <p><b>2.5    PROCEDURE OR ANALYSIS</b></p> <p>All applications should be done in a fume hood.</p> <p>2.5.1    Dipping</p> <ol style="list-style-type: none"> <li>1. Completely immerse each item to be processed in the working solution until the item is completely saturated, usually five seconds or less. The item can be manipulated using tongs or forceps.</li> <li>2. Remove and allow the item to dry completely.</li> <li>3. Place the item in the heat/humidity chamber at no greater than 80 degrees centigrade and between 60% and 80% relative humidity, or the item may be steam ironed.</li> <li>4. Check the item periodically to monitor the impression development. Care should be taken not to saturate the item with water vapor.</li> </ol> <p>2.5.2    Brushing and Spraying</p> <p>Larger items which will not fit conveniently into processing trays can be saturated with the ninhydrin solution using a soft bristle paint brush. The items may also be processed by spraying. Spray the item until saturated and air dry.</p> <p><b>2.6    INTERPRETATION OF RESULTS</b></p> <p>Ninhydrin coloration is not permanent, and while some impressions have remained visible for years, others have faded in a matter of days. Photographic preservation is essential and must be accomplished as soon as possible.</p> <p><b>2.7    REFERENCES</b></p> <ol style="list-style-type: none"> <li>1. <u>Footwear Impression Evidence</u>, Bodziak, 1990, p 169</li> </ol> <p align="right">◆End</p>	